MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

The City of Rolla
A Case Study of Small Business Resilience and Energy Burden
Three Sisters Consignment

Missouri Roadmap to Resilience
Missouri Department of Natural Resources

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Photo credit: Angie Tutterow

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Purpose of the Case Study

Improving resilience of small- to medium-sized (SMSC) communities is increasingly important throughout the United States.[1] SMSC are not only disproportionately impacted by chronic stresses and acute shocks, but often lack the resources to recover quickly compared to their more urban counterparts. Investing in resilience-focused initiatives within these communities is imperative to maintain community character and livability, especially for vulnerable populations. The *Roadmap to Resilience*[2] (*Roadmap)* was developed by the Missouri Department of Natural Resources (MoDNR) with support from the United States Department of Energy (USDOE) as an implementable framework to address challenges and improve resilience within SMSC. Additionally, the *Roadmap* is intended to serve as a scalable resource that can be applied in various capacities- from individual users to entire communities.

This case study presents an application of the *Roadmap* to the City of Rolla, Missouri. More specifically, the case study focuses on the energy burden concerns of a singular business located in Rolla's downtown district. Like many other SMSC, Rolla's economy is comprised of several vital locally owned businesses. The document demonstrates how the *Roadmap* actions and trackable metrics can be used to support the city's local businesses through energy considerations. By leveraging the *Roadmap,* businesses can implement energy efficiency opportunities and reduce their energy burden, thereby increasing the economic resilience of the community. These energy burden reductions can offer significant economic improvements for small businesses, particularly in the face of the COVID-19 pandemic and its associated business closures. By incorporating elements of the *Roadmap* framework, Rolla can better address the key relationship between energy burden and economic performance and ultimately strengthen its downtown economic resilience.

The tools included in the final *Roadmap* feature guidance about stakeholder engagement, developing partnerships, accessing funding opportunities and defining metrics to measure success. The *Roadmap* provides a scalable approach for many SMSC to apply in their hometowns to increase resilience.

The Roadmap to Resilience

Resilience for Small-to Medium-Sized Communities:

The ability of communities to withstand, adapt to and reduce the impact of acute shocks and chronic stresses while preserving and improving their unique characters, sense of community and livability.

[1] For the purposes of this document, small- to medium-sized communities are defined as rural areas, non-urban areas with a population of less than 2,500 people. Medium-size communities are defined as urban clusters, which are urban areas with a population of 2,500 to 50,000 people. U.S. Census Bureau (2019). 2010 Census Urban and Rural Classification and Urban Area Criteria. census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural/2010-urban-rural.html

[2] Missouri Department of Natural Resources, Division of Energy (2020). *Roadmap to Resilience.* energy.mo.gov/content/roadmap-resilience

The *Roadmap* was released in 2021[3] and the document is intended to serve as a resource for SMSC in improving their resilience by providing a number of tools and resources. Resilience for SMSCs is the ability to withstand, adapt to and reduce the impact of acute shocks and chronic stresses while preserving and improving their unique characters, sense of community and livability. The *Roadmap* recognizes the unique challenges and strengths present in SMSCs and enables local leaders to take meaningful actions towards creating a more environmentally, socially and economically resilient future. As access to affordable, reliable and resilient energy services is central to building resilient SMSCs, the *Roadmap* focuses on improving energy systems through energy efficiency, grid modernization and renewable resources to reduce critical load, increase redundancy, reduce energy burden and harden infrastructure.

An SMSC-centric approach was used to develop the *Roadmap*, supported by local insights, leading resilience practices and expert research. A stakeholder engagement process served as the foundation that included workshops focused on energy-related topics such as energy and critical facilities infrastructure, economic development and growth, resilient community operations and energy burden. Engaged stakeholders included local government representatives, local businesses, electric utilities, academic institutions and technical stakeholders among others. Findings from local insights and an inventory study of baseline assets and practices were analyzed, synthesized and expanded upon to develop the *Roadmap* as well as metrics to track resilience progress.

Chronic Stress:

Persistent, long-term issues or hardships that weaken a community's social, economic and environmental fabric and exacerbate outcomes to acute shocks. Examples include:

- Declining population
- Lack of access to healthcare
- Energy burden

Acute Shock:

Sudden, high intensity events that pose a direct threat to a community. Examples include:

- Floods
- Pandemics
- Extreme heat

Resilience Vision:

Resilient SMSC are equipped with energy resources to thrive environmentally, socially and economically in the face of chronic stresses and acute shocks.

The development process of the *Roadmap* and its vision includes a partnership with three Missouri communities, the cities of St. James, Rolla and Stockton. These cities provided invaluable context, guidance and feedback throughout the progression of the tools and leading practices. To demonstrate application of the *Roadmap's* scalable resilience planning tools, case studies for two of these cities have been developed. These case studies use local context, data, resources and priorities to guide St. James and Rolla in their pursuit of reaching the Resilience Vision.

Phases of Resilience Planning

The *Roadmap* presents four foundational phases of resilience planning, which are supported by six guiding actions (see Figure 1). The guiding actions serve as actionable building blocks for communities to launch their resilience planning efforts through each phase. All of the phases and actions are guided by overarching concepts of transparency and inclusivity to build local support and comprehensively identify and address community priorities.

[3] This material is based upon work supported by the U.S. Department of Energy, Office of Energy Efficiency and Reviewable Energy, State Energy Program under award number DE-EE008612.

The four phases of resilience planning are:

1) Assess
2) Envision
3) Implement
4) Evaluate

The phases are intended to be successive and followed in the order in which they are presented.

Assess – Defining critical areas and examining existing conditions.

In this phase, communities define their resilience objectives and goals as well as identify resilience threats and stressors. It is critical to have a variety of stakeholders involved in this phase because of the value of having comprehensive and cross-sectoral representation. Additionally, a baseline assessment of existing energy assets and conditions is outlined to serve as a foundation for resilience-building efforts. Examples of assessment considerations include existing community energy burden, utility structure and distributed energy resources.

Envision – Collectively set resilience goals and quantitative targets.

Communities use the baseline conditions identified in the “Assess” phase to envision actionable targets to achieve through implementable measures. Feedback and approval from stakeholders and local authorities is solicited as needed in order to refine and finalize energy targets and goals.

Implement – Engage participants and integrate solutions.
Communities work with key stakeholders to define clear, actionable steps to implement initiatives that accomplish the targets set in the “Envision” phase. This will include developing partnerships and timelines, as well as considering funding sources to implement effective initiatives.

Evaluate – Evaluate potential impacts and benefits of investments and initiatives.

Communities monitor strategies and progress on critical areas, report findings and adjust planning and implementation as needed to support ongoing monitoring of metrics and goals.

Actions of Resilience Planning

Stakeholder Engagement – Engage stakeholders early in the resilience planning process.

Stakeholders should be engaged to articulate priorities, assess baseline conditions, refine goals and assist in developing implementation strategies. Successful stakeholder engagement can increase the potential for long-term support and the chances for success.

Conduct Baseline Analysis - Conduct a thorough evaluation of existing conditions.

Identification of areas of opportunity that meet community needs and leverage existing strengths by a thorough assessment of existing structures, barriers, systems, assets, initiatives, and partnerships.

Leverage Partners and Assets – Convene skills, resources and perspectives.

Leveraging available resources, partners and assets can aid in mitigating critical gaps in funding and expertise, as well as provide a number of additional co-benefits.

Identify Innovative Funding Sources – Offset resilience initiative costs.

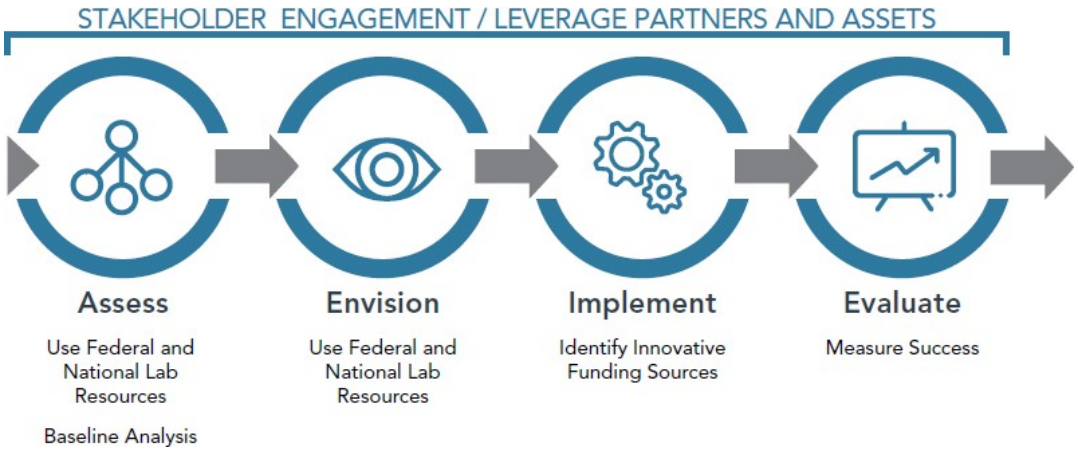
SMSC often face increased funding barriers and leveraging funding sources can play a critical role in determining whether plans can be implemented.

Use Federal and National Lab Resources – Support projects and initiatives.

Use several quantitative and qualitative tools available from federal agencies and national laboratories, such as USDOE, FEMA and EPA, to support resilience planning and support projects.
Measure Successes – Define metrics and performance indicators early in resilience planning.

Consistent measures to monitor progress enable communities to effectively demonstrate progress and accountability, promote continuous improvement and make forward-looking decisions and investments.

Figure 1 *Roadmap* Framework



Rolla Background

Located at the crossroads of an interstate and major state highway in south-central Missouri, the City of Rolla is the county seat of Phelps County. The City is also home to the Missouri University of Science and Technology (MS&T), which has an enrollment of 7,600[4] and is renowned for its school of engineering and science programs.

Rolla has a population of just over 20,000 and a median household income of approximately $35,000, well below the Missouri average of $53,600.[5] In fact, 31% of residents in the City of Rolla live below the poverty line, more than double the state average.[6] Its three largest employment sectors are education/healthcare/social services employing 41% of the community's workforce, entertainment/food/tourism employing 14% and retail which employs 13%.[7]

Downtown districts, particularly in SMSC, represent far more than a mere location for commerce. They are places of gathering, community engagement and access to key services. Downtown districts create a sense of community identity and businesses are more likely to support local events, charities and organizations than nationwide chains. The Rolla downtown area is located adjacent to the MS&T campus and encompasses approximately 77 acres of land over 41 blocks. Businesses in downtown Rolla cater to the student and general populations in dining and retail offerings. Approximately half of the land use downtown is commercial/retail. It also contains banking, city government, the local library, multiple churches, a lumber yard and numerous professional offices. Both multi- and single-family

[4] Potter, Sarah. (2020). *Fall enrollment at Missouri S&T more than 7,600, applications up for 2021*. Missouri S&T. news.mst.edu/2020/09/fall-enrollment-at-missouri-st-more-than-7600-applications-up-for-2021/
[5] United States Census Bureau (2018). American Community Survey, 5-Year Data Profile 2014-2018. census.gov/programs-surveys/acs.
[6] Id.
[7] Id.

dwellings are located downtown with a significant number of single-family homes in the southeast corner of the district. There is one industrial facility located downtown.

Rolla Municipal Utilities provides electricity and water services to the community. The Rolla Public Works department is responsible for streets, sidewalks, storm and sanitary sewers and wastewater treatment. Natural gas is available in downtown Rolla through Ameren, an investor-owned utility.

Similar to many other SMSC, Rolla's downtown has been impacted by the COVID-19 pandemic. Nationwide, stay-at-home orders have resulted in business closures, layoffs and negative economic impacts. This has intensified local SMSC chronic stresses such as low household incomes, poverty and poor business retention. To address these impacts, many businesses in Rolla have introduced non-standard service options, such as online sales, curbside pick-up, extended delivery radius, virtual appointments and gift card purchase options. While such service options have benefited businesses and customers alike during the pandemic, it is critical to provide support to businesses that allows them to maintain their brick-and-mortar locations in order to maintain a strong and vibrant downtown district.

Energy Burden and Resilience

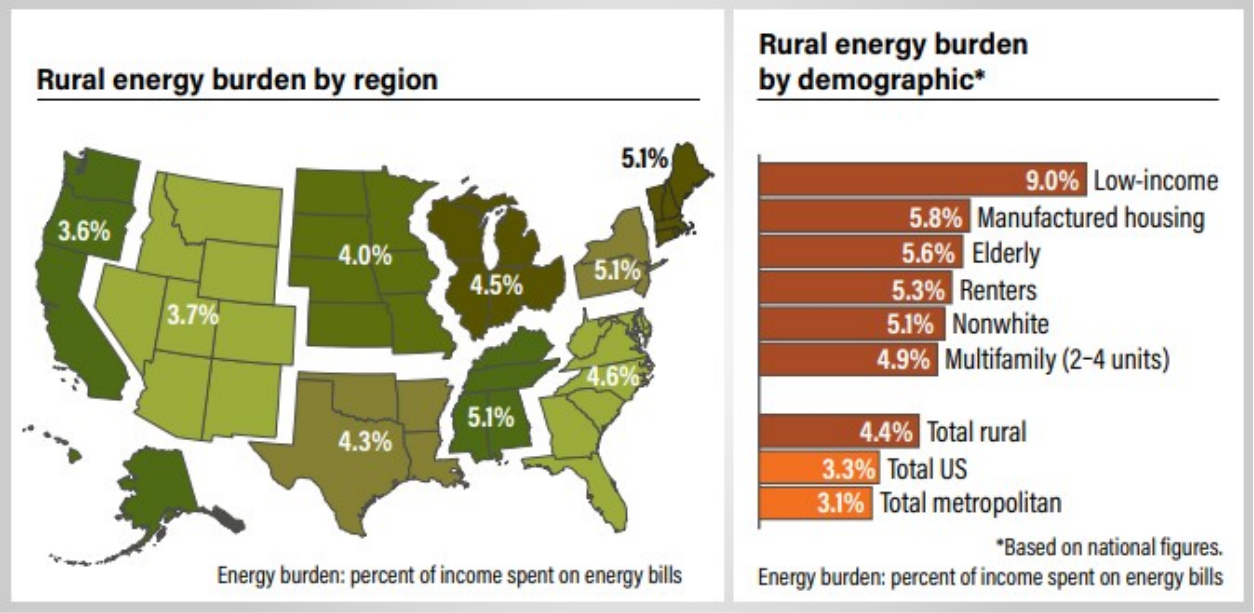
Energy burden has long been a metric affiliated with households and refers to the proportion of household income directed towards energy costs, typically focusing on utility energy bills.[8] For many households, energy costs are a significant financial burden. The U.S. Department of Health and Human Services classifies energy burden above 6% as unaffordable. Many households pay as much as 10% of their total income on utilities alone. Most compelling for SMSC, studies found that rural low-income households often experienced energy burden at a rate three times higher than their non low-income counterparts[9].

Low-income households typically lack energy efficiency measures or renewable energy improvements, which provide opportunities for reduced energy bills. In fact, if low-income housing was as energy efficient as the average U.S. home, energy costs for low-income homes would decrease by 33%, reducing their energy burden significantly.[10]

Energy burden impacts household resilience, decreasing families' ability to withstand and recover from acute and chronic stresses. High levels of energy burden contribute to dangerous cycles of poverty that can have lasting generational impacts. These families are also more susceptible to predatory short-term loans with high interest rates to pay bills. On average, energy burdened households are twice as likely to remain in poverty for a long period of time, compared to non-energy burdened households.[11] Families unable to pay their utility bills are at risk for shutoffs, which can lead to homelessness. High energy burden has also been linked with negative health impacts. Negative health impacts can have further cascading effects of missed work and school days, higher health care costs, mental or emotional stress on individuals and families. Figure 2 presents the average rural energy burden by region as well as demographic.

[8] Drehobl, Ariel. (2016). Explaining the unique energy burden of low-income households. ACEEE. aceee.org/blog/2016/05/explaining-unique-energy-burden-low
[9] ACEEE. (2019). Understanding Energy Affordability. aceee.org/sites/default/files/energy-affordability.pdf
[10] Durkay, Jocelyn. (2017). *Energy Efficiency and Renewables in Lower-Income Homes*. NCSL. ncsl.org/research/energy/energy-efficiency-and-renewables-in-lower-income-homes.aspx
[11] Drehobl, Ariel. Ross, Lauren. Ayala, Roxana. (2020). *How High Are Household Energy Burdens*? ACEEE. aceee.org/research-report/u2006

Figure 2 Rural Energy Burden



Source: American Council for an Energy-Efficient Economy, 2018

In Missouri, the average household spends three percent of its income on energy costs. Phelps County, in which Rolla is located, also has an average household energy burden of three percent which is lower than surrounding counties.[12] Both Missouri and Phelps County have energy burdens well below the regional average.

Although less researched, the impacts of energy burden are not only experienced in households and can impact businesses as well, particularly small ones. One industry survey showed that energy is one of the top three expenses for 35% of small businesses.[13] Collectively, small businesses spend more than $60 billion annually on energy related costs.[14] Expenses include light bulbs, space heating, central cooling systems, desktop computers, security lighting, monitors, emergency exit signage, coolers, copy machines and other equipment. For this case study, the energy burden of a business is defined as the ratio of the mean business energy bill to the mean, monthly business revenue.

Without strategic efforts to mitigate energy burden and reduce energy costs, many smaller, locally owned businesses are at risk of recovering from economic downturns and ultimately closing. High energy burden impacts the resilience of the business and the that of the community. Local businesses are more likely to donate to local charities and events and the loss of local, downtown businesses impacts the foundational sense of community and charm in SMSC. The loss of these businesses also destabilizes the ability of the community to provide vital services to residents. Small businesses employ local residents and are significant contributors to the community's tax base. Additionally, money spent at a locally owned, small business stays in the community at a much higher rate than money spent at businesses owned by large corporations and chain stores.[15]

SMSC downtown businesses also contribute to community resilience due to their location. These centrally located, compact, and walkable downtowns not only result in reduced vehicle emissions, but

[12] U.S. Department of Energy, Low-Income Energy Affordability Data (LEAD) Tool. energy.gov/eere/slsc/maps/lead-tool
[13] National Federation of Independent Business. Energy Consumption Poll. nfib.com/advocacy/energy
[14] ENERGY STAR®. *Small Businesses: An Overview of Energy Use and Energy Efficiency Opportunities*. energystar.gov/sites/default/files/buildings/tools/SPP%20Sales%20Flyer%20for%20Small%20Business.pdf
[15] BBB. *10 Ways Small Businesses Benefit Their Local Communities.* medium.com/@BBBNWP/10-ways-small-businesses-benefit-their-local-communities-7273380c90a9

also contribute to the health of residents, shoppers and employees. Businesses operating in downtown areas lessen the impact on city budgets by use existing infrastructure, thus avoiding the cost of new construction, and by decreasing sprawl which requires additional maintenance and city services such as policing and street maintenance.

There are several key drivers of energy burden that can be categorized into four primary categories:

1) Physical
2) Economic
3) Policy
4) Behavioral

Examples of barriers in each of the categories are described below. As presented in the *Roadmap,* communities should actively assess their own unique circumstances to determine the most impactful programs and incentives to meet their needs.

Physical Energy Burden Drivers:

- **Heating system efficiency:** Furnaces and boilers use an efficiency measure of annual fuel utilization efficiency (AFUE). The AFUE measure is the ratio of annual heat output compared to the total annual fossil fuel energy consumed. For example, an AFUE rating of 75% would mean 75% of the energy in the fuel becomes heat and the remaining 25% is lost. Aging fuel systems and particular fuel types can be less efficient, causing greater energy losses, requiring more energy to provide the same levels of heating. Maintenance is also a key component of ensuring efficiency and poorly maintained systems can significantly impact energy usage.
- **Building envelope:** Building envelope refers to the physical barrier between the conditioned environment and the unconditioned environment. A conditioned environment can refer to heating or cooling being used in that space. Typically, an envelope includes walls, doors, windows, roofs and insulation. The goal of these components is to minimize the amount of energy transfer between the conditioned and unconditioned spaces and is often accomplished by selecting effective insulation materials and making sure seals are tight. The building envelope is a critical component of design and has significant impact on energy efficiency. Envelopes not able to contain energy effectively can cause significant leaks of air requiring increased use of energy within the space resulting in increased energy costs.
- **Weather extremes:** The more extreme the weather, the larger the savings from efficiency.[16] For example, if it is very cold outside, it takes more energy to keep a business well-heated. However, a well-insulated business would not need to account for energy losses during heating and would be able to reap greater energy savings than other establishments without sufficient insulation. As many communities continue to experience both extreme heat and cold events, decreasing energy transfer with the external environment can reduce energy-related expenditures significantly.

Economic Energy Burden Drivers:

- **Level of business revenues:** If a business is experiencing decreasing business revenue while their utility bills remain constant, the ratio of costs will increase and drive up energy burden. This has been of particular concern during the COVID-19 pandemic, in which many local businesses have indicated reduced revenue due to stay-at-home orders. The subsequent economic impacts

[16] Goldstein, David. (2019). *Energy efficiency: The Extreme-Weather-Resilient Resource*. NRDC. nrdc.org/experts/david-b-goldstein/energy-efficiency-extreme-weather-resilient-resource#:~:text=But%20energy%20 efficiency%20is%20the,larger%20 the%20savings%20from%20efficiency

have decreased revenues for many businesses. Energy efficiency opportunities can reduce utility costs and support small businesses during times of decreased revenue.

- **Upfront costs:** Energy efficiency investments can require upfront costs that many small businesses cannot afford, particularly in times of decreased business revenues. Although many businesses recognize the long-term reductions possibly achieved from some measures, they lack the capital to pay for physical improvements. Additionally, there are not always programs and incentives available to support such measures. If small businesses prioritize energy efficiency measures during times of good revenue, they can help decrease their utility costs, enabling them to stay afloat during times of decreased revenue.
- **Split incentive of efficiency measures in rental properties:** In most rental arrangements, the landlord is responsible for building improvements, including those that would increase energy efficiency, while the tenant is often responsible for paying energy costs. Because there is a perception that landlords do not receive immediate benefits of decreased energy costs, they are less incentivized to make capital investments in energy efficiency measures. On the other hand, tenants, particularly those in shorter term leases, are hesitant to invest in building efficiency measures unless the cost can be recovered through energy savings during the term of the lease. HVAC systems and other improvements resulting in deep energy savings typically take longer than most lease terms to recover through lower energy bills.

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Policy Energy Burden Drivers:

- **Insufficient policies and programs addressing small business energy efficiency:** Most available energy efficiency programs, resources and incentives target households. Small businesses can have very specific needs that differ from households, and as such, policies and programs should be developed that encourage small businesses to evaluate their energy burden and identify measures that would yield effective reductions. Even on a household level, the majority of funding support to address low-income energy burden within the U.S. is targeted at helping customers pay their bills – a measure that does not address root causes of energy spending, customer energy education and does not empower or encourage customers to reduce their energy burden. Utility-led small business programs are unlikely to increase significantly in scale and scope without supportive regulation that changes the narrative for energy efficiency broadly as well as for low-income and small business programs. These programs and initiatives are particularly important to encourage adoption of energy efficiency programs by municipal utilities.
- **Utility rate design:** Design of utility rates can be a barrier to encouraging implementation of energy efficiency measures. If rates are structured to have high fixed charges that don't change, regardless of energy reductions, businesses are less likely to invest in implementing measures.
- **Owner vs. renter considerations:** A common barrier to implementation of energy efficiency measures is determining responsibility. Many renters are hesitant to pay for efforts that could improve efficiency as they do not own the spaces in which they are located. Alternatively, many owners do not find energy efficiency measures to be a critical expense that must be incurred to maintain the safety and wellbeing of their tenants. As such, improvements are largely neglected. Clear guidance on the benefits to owners of ensuring their rented spaces are energy efficient could significantly reduce this barrier.

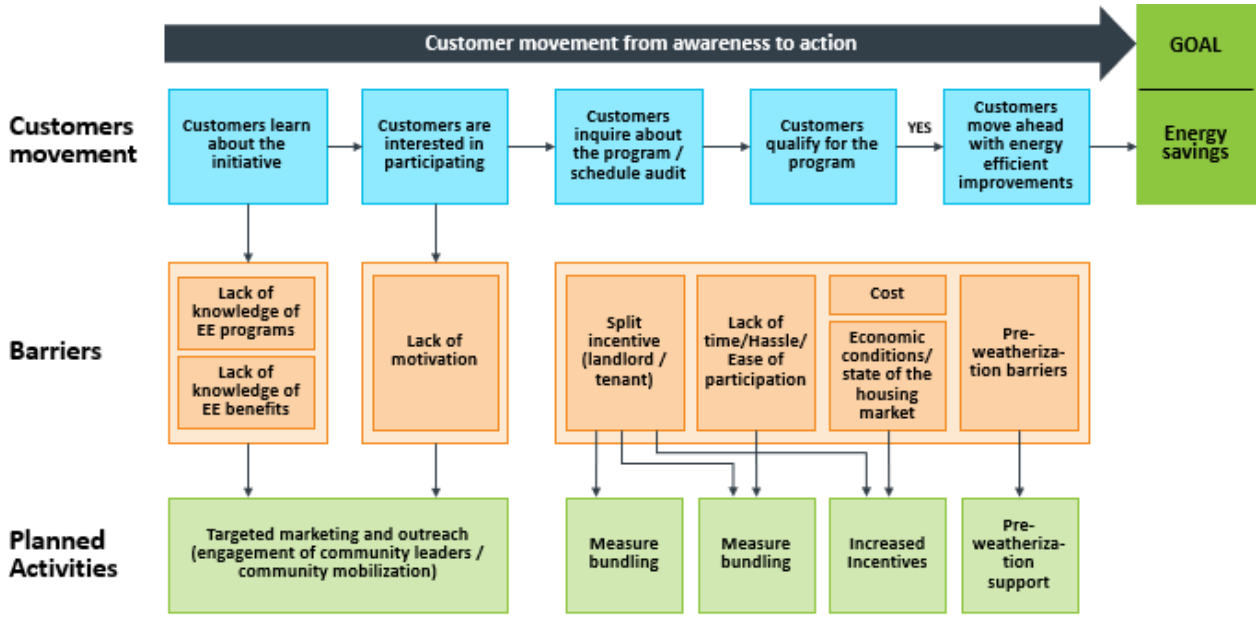
Behavioral Energy Burden Drivers:

- **Lack of knowledge:** Many businesses and landlords lack knowledge of the various energy efficiency measures that can be implemented as well as the resulting energy usage reductions

they could see. Further, a lack of knowledge of available incentives and demand response programs can decrease participation in such programs. This lack of familiarity can be a barrier in reducing energy burden within small businesses.

- **Oversight resources:** Installing energy efficiency measures within a business can certainly require upfront time and effort that is expected to level off to fairly minimal monitoring once implemented. Despite this, some small businesses may lack the resources to provide this time, which decreases the likelihood they will implement energy efficiency measures in the first place.

Figure 3 Customer Movement from Awareness to Action



Source: Opinion Dynamics, Efficient Neighborhoods+® Initiative Evaluation Report

Utilities can achieve many benefits by encouraging energy burden reductions which can increase energy and economic resilience. Reduction in peak loads generally lead to a reduction in overall energy costs and reduced strain on the grid. With reduced strain, a system may experience fewer power outages and have the ability to shift resources into proactive maintenance and upgrades to further increase reliability and resilience. Best practices for energy efficiency programs include partnerships, customer engagement, innovative financing and overall education activities to mitigate upfront costs and remove energy efficiency barriers. These strategies are discussed in the *Roadmap*. Expected outcomes include reducing:

- Carrying costs.
- The number of bad-debt write-offs.
- Electricity terminations and reconnections.
- Costs of bill payment assistance programs.
- Customer calls and collection activities.
- Reduction of peak load.

Small Business Energy Use Checklist

Small businesses can use some of the following helpful tips to begin to reduce energy use.

- Measure and track energy performance.
- Control direct sunlight through windows to prevent or encourage heat transfer in winter or summer.
- Ensure lights are not always on and only turn on needed lights. Ensure all lights are turned off at the end of the day.
- Only use heat and air conditioning during necessary hours. Consider using a smart thermostat system to take advantage of non-peak rates and optimization incentives. Businesses can also use after-hours and weekend thermostat setting for times when staff are not in the space.
- Set computers to sleep when not in use. Short energy breaks can reduce energy use by up to 70%.
- Use compact fluorescent bulbs, which cost 75% less than their incandescent counterparts and can last 10 times longer.
- Install ENERGY STAR fixtures, which use at least 67% less energy than regular ones.

Downtown Rolla Baseline Assessment

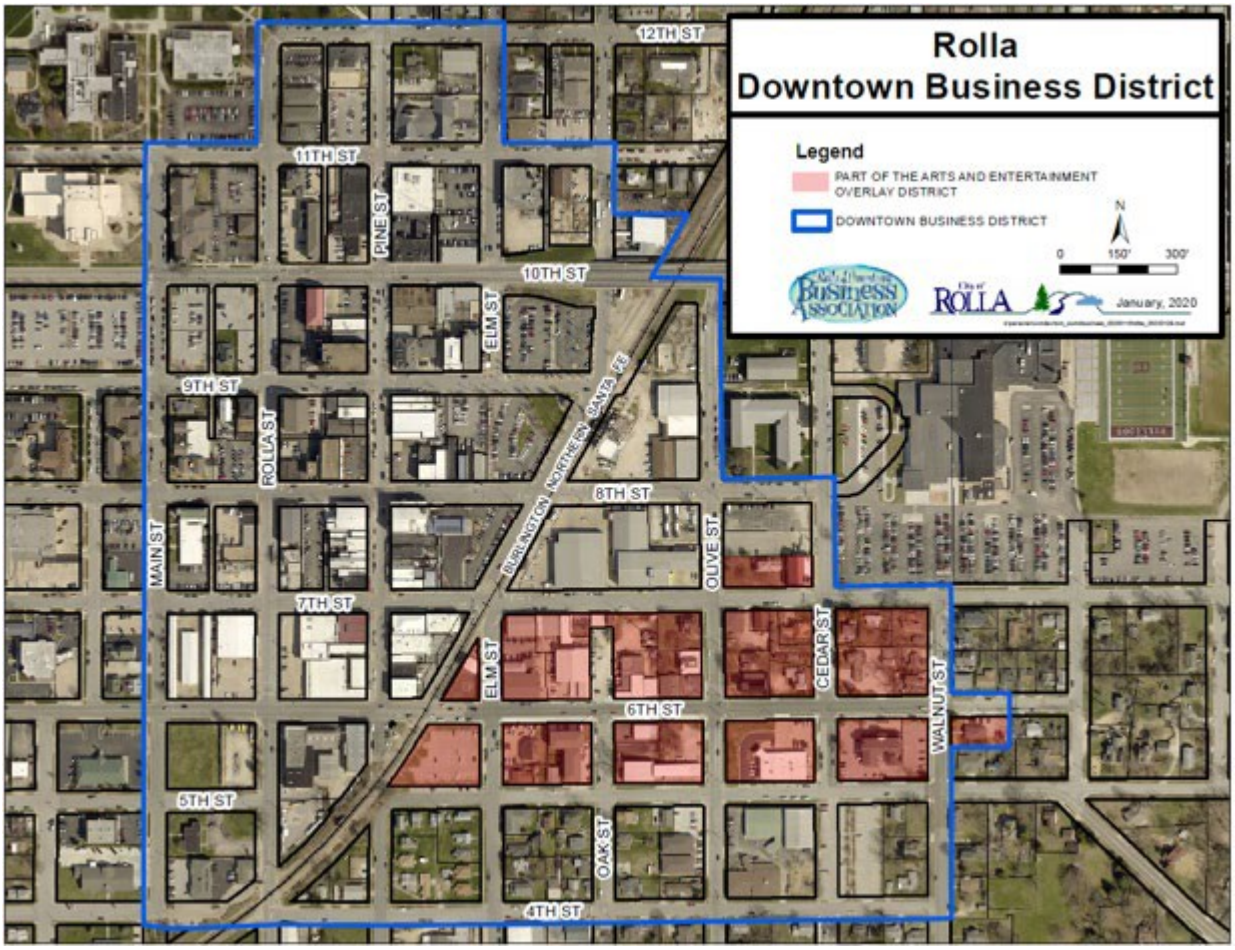
Conduct a thorough evaluation of existing conditions.

A thorough assessment of existing structures, barriers, systems, assets, initiatives and partnerships can be used to identify areas of opportunity that meet community needs and leverage existing strengths.

Location

The Rolla downtown area covers approximately 77 acres and is located approximately one-half mile south of Interstate 44. The Downtown Business District Map below, shows the boundaries and street layout of downtown (Figure 4). It lies adjacent to MS&T to the north and west and is adjacent to the Rolla High School to the east. The downtown district is the original commercial core of Rolla, anchored by the historic path of Route 66 along the present-day Pine and 6th Streets, and the rail line which bisects downtown from the southwest to northeast.

Figure 4 Map of Downtown Rolla



Source: City of Rolla and the Rolla Downtown Business Association

Downtown Land Use, Businesses and Economic Impact

Downtown Rolla has a number of varying land uses. The 2019 Center City Area Land Use Map, prepared as part of the City's Comprehensive Plan, shows that more than half of the area is used for commercial and retail purposes and the majority of commercial and retail use is along Pine and Rolla Streets, north of 6th Street. The district also contains professional offices, churches, industrial facilities and both single- and multi-family dwellings. Both the City of Rolla and MS&T have offices and other facilities in downtown. While the exact number of downtown businesses is unknown, the Rolla Downtown Business Association maintains an email list of 136. In 2014, the downtown area consisted of 75 property owners and approximately 130 businesses.[17]

A retail market analysis of downtown Rolla identified the uses occupying first-floor commercial space as well as the retail sales generated by retail and restaurants.

[17] "Downtown Strategic Plan, City of Rolla, MO" (PGAV Planners 2014), page 22.

Table 1 Downtown Rolla Commercial Space

Use	Square Footage	Retail Sales Per Square Foot	Total Retail Sales
Restaurant	12,100	$89	$1,076,900
Retail	82,100	$167	$13,710,700
Office/Service	143,100	NA	NA
Mixed-Use	52,100	NA	NA
Total	**289,400**		

Source: Downtown Strategic Plan, City of Rolla, MO, Prepared by PGAV Planners

The Downtown Strategic Plan also noted when the retail analysis was conducted, restaurant and retail space generated approximately $8.3 million in sales taxes, which are allocated between the State of Missouri, Phelps County and the City of Rolla.[18]

Building Conditions

Building age and condition in downtown Rolla varies. The vast majority of buildings are more than 20 years old, and many of the structures were built between 1900 and 1940. The Downtown Strategic Plan noted that building conditions range and showed several buildings in poor or dilapidated condition.[19]

Rolla Municipal Utilities' Electric Rates and Charges

Rolla Municipal Utilities (RMU) provides electric distribution services to the community including the customers located downtown. Information provided by RMU indicates the majority of businesses in downtown fall into their commercial, single phase service, customer class. The class includes non-residential customers with actual metered monthly demand of less than 100kW. Rates for this customer class were last changed in October 2019. The rates and charges for this class, as well as resulting costs for certain levels of usage, are available in Table 2. RMU does not offer any energy efficiency or demand management programs.

Table 2 RMU Commercial Electric Rates

Commercial Rates and Fees		
	Effective Oct. 1, 2016	Effective Oct. 1, 2019
Service Availability Fee (Single Phase Meter)	$20 per month	$24 per month
Energy Charge (per kWh)	$0.0890	$0.0790
Power Cost Adjustment (per kWh)	($0.0053)	$0.0000
Net Energy Charge (per kWh)	$0.0837	$0.0790
Electric Costs by Amount of Usage		
	Effective Oct. 1, 2016	Effective Oct. 1, 2019
1,000 kWh per month	$103.70	$103.00
3,000 kWh per month	$271.10	$261.00
10,000 kWh per month	$857.00	$814.00

[18] The current sales tax rate in Rolla is 7.6%. Of that amount, 4.225% is the State of Missouri, 1.125% is Phelps County, and 2.250% is the City of Rolla.

[19] "Downtown Strategic Plan, City of Rolla, MO" (PGAV Planners 2014), pages 12-13.

Source: Rolla Municipal Utilities

In addition to the electricity rates and charges, the electric utility also collects a Payment in Lieu of Taxes (PILOT) from its customers, which is transferred to the City's general fund. Established by city ordinance, this fee is a set percentage of gross receipts of electric and water service. The current PILOT was set at 5% in 2012. RMU billing occurs monthly and includes charges for both electric and water services. The average monthly electricity cost for ten downtown businesses can be seen in Figure 6 in the following section.

Building and Energy Codes

The City primarily uses the 2018 International Code Council (ICC) Codes and has adopted the 2000 ICC Energy Code.

Survey Method

To better understand downtown business perspectives, the project team developed a survey, included in Appendix A, asking downtown businesses for information regarding their:

- Business Type and Size
- Economic Performance
- Energy Burden and Energy Efficiency Measures
- Energy Use Reduction Strategies
- Information to Compute Energy Burden

The survey provided opportunities for both open ended and yes/no answers, as well as asking survey participants to rank provided choices. The Rolla Downtown Business Association (RDBA) sent the survey to its member email list of 136 businesses. Project team members followed up with responding businesses to clarify answers and gather additional information. Project team members also conducted in person surveys at a 2020 RDBA meeting.

Survey Results

Ten businesses returned the survey and the completeness varied by respondent.

Business Type and Size

- **Business Type:** Nine of the respondents are commercial businesses with five of those being primarily retail sales and four service-oriented businesses.
- **Number of Employees:** The businesses report employing between one and six full time employees, with total employees between one and 10.
- **Hours of Operation:** One respondent is open by appointment. Others are open between 33 and 50 hours per week. All operate only during daytime hours.

Economic Performance

Businesses were asked to rank concerns related to economic performance, with 1 being most concerning to 6 being least concerning.

Overall, the ranking of most concerning to least concerning was:

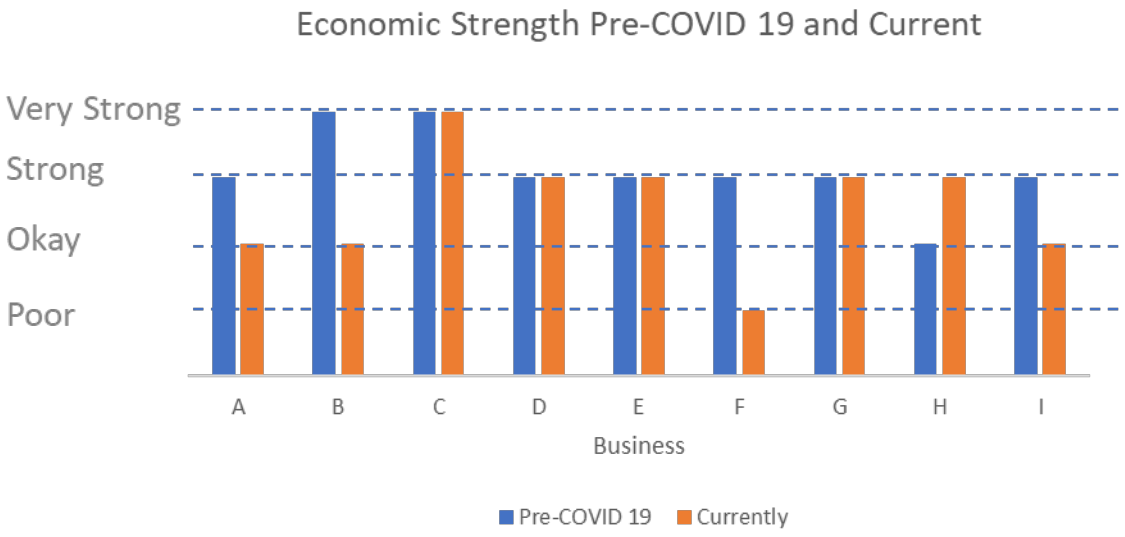
1. Number of Customers

2. Mortgage/Rent Costs
3. Energy Costs
4. Inventory Costs
5. Personnel Costs
6. Equipment/Supply Costs

Energy costs were a greater concern for those that rent than owner-occupants.[20] One business indicated that energy costs were “always” a significant burden, more than half of respondents indicated that energy costs were a significant burden “sometimes” and only one respondent indicated their energy costs were “never” a significant burden. More than 60% of the businesses said this had not changed since the onset of COVID-19. Those that stated it had changed indicated that energy costs were always or often a significant burden.

The survey also asked respondents to provide information about the impacts of COVID-19 on their business performance. Four indicated their businesses had been “significantly negatively impacted”, two had “some negative impact” and two had “some positive impact” (attributed to expanding non-standard services such as online and delivery). One business indicated they were “initially negatively” impacted, but the impact has subsided. When asked about their economic strength pre-COVID-19 and at the time of the survey, businesses responded as shown in Figure 5.

Figure 5 Economic Strength Comparison



Source: Downtown Business Survey, AECOM

Energy Burden and Energy Efficiency or Conservation Measures

Almost 80% of the businesses surveyed stated they were “very aware” of energy efficiency measures available, and more than two-thirds would be “comfortable” making energy efficiency improvements. Only one of the respondents would not consider making energy efficiency improvements, but this was due to the fact they are relocating.

Cost was cited as the most frequent constraint to making energy efficiency, with 40% of the respondents mentioning it. Of those that rented, all were interested in energy efficiency; however most indicated they were unlikely or unwilling to do so because they didn’t own the property. One business

[20] Based on respondents that indicated whether they rent or own.

indicated they had already made energy efficient improvements including two 20 SEER heat pumps and LED lighting.

LED lighting was the improvement most often considered by the responding businesses. Seventy percent of respondents would consider installing LED lighting. Almost 30% of those responding would consider new windows and one would consider better insulated ceilings.

All businesses responding have already installed some level of energy efficiency measures or use energy reduction strategies. Programmable thermostats were the most common installation with almost 90% of the respondents having them. LED lights have been installed in more than 40% of the responding businesses and one-quarter have either highly efficient HVAC systems or new windows. One building owner also installed a Thermoplastic Polyolefin (TPO) roof.

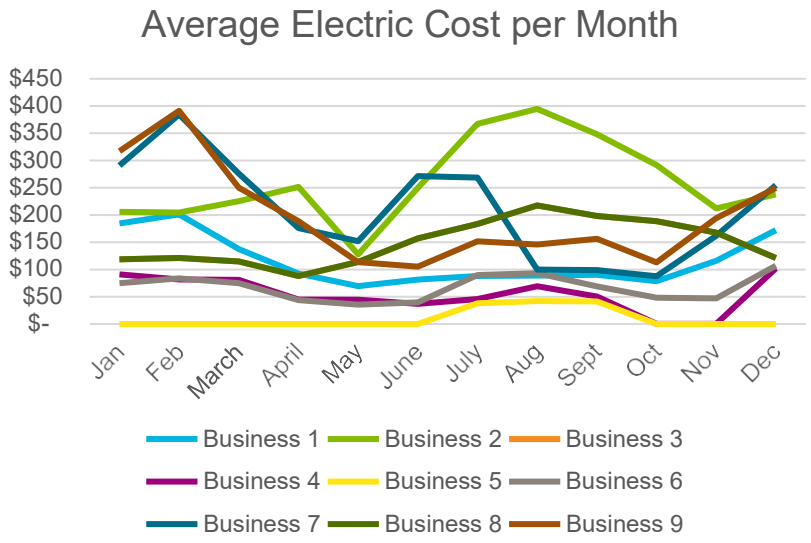
None of the respondents indicated an energy audit had been performed on their building.

None of the buildings are equipped with solar or renewable energy sources.

Information to Compute Energy Burden

When asked to provide information necessary to calculate energy burden, business revenues and energy costs, all businesses responding allowed RMU to provide usage information to the project team. None of the businesses provided revenue information sufficient to calculate energy burden. One business stated their combined electric, water and sewer bill equaled approximately 35% of the store's annual revenue. The average electric cost per month for the responding businesses is shown in Figure 6.

Figure 6 Electricity Costs per Month



Source: Rolla Municipal Utilities, AECOM

Rolla Downtown Business Profile: Three Sisters

Of the businesses that responded to the survey, Three Sisters[21] was identified as a business for case study follow-up. Three Sisters is a resale and consignment center located in Rolla, Missouri. They

[21] Three Sisters Consignment. threesistersmo.com

carry clothing, furniture and home décor. The store is a 2,000 square foot rented space in Rolla's downtown shopping district. Most recently, the store was voted the #1 resale shop in Phelps County.

As a follow-up to the survey, an in-depth interview was scheduled with Three Sisters to discuss specific energy concerns and perspective regarding energy efficiency measures. As a small business, three of the primary costs that were identified to impact economic performance were:

1. Employee payroll
2. Storefront rent
3. Energy-related costs

Despite energy-related costs being a significant cost consideration, the store owner indicated a lack of familiarity with energy efficiency measures and said they would not feel comfortable implementing measures without support and guidance. Further, the fact that Three Sisters is located in a rented space creates an all-too-common level of complexity when addressing implementation of energy efficiency measures. While renters often indicate a preference for energy efficiency measures to be directed by owners of the spaces, owners often feel as if it is a renter's responsibility to control their own energy costs. Renters are hesitant to invest in building improvements when they do not own the building. Even in the best of owner-tenant relationships, there is often a lack of direct conversation regarding the advantages of implementing such initiatives.

Currently, Three Sisters' energy efficiency measures are limited to LED lighting and window awnings. The building in which Three Sisters is located is two stories with an additional basement. Three Sisters occupies the ground floor consisting of 2,000 square feet, and the property owner maintains the second floor for a by-appointment-only commercial business. Half of the first floor is heated by a natural gas, forced air system and portable electric space heating is used to provide supplemental heating for the other half. Recent, winter energy costs have been from approximately $250 to $350. Energy costs decrease during the spring and fall and increase as air conditioning is used. The building's thermostat is digital, but not programmable. As a tenant, the proprietor of Three Sisters had limited knowledge about HVAC equipment, building envelope and whether building floors were separately metered, although the proprietor does report that the front windows and basement have significant air leakage.

The proprietor of Three Sisters indicated an interest in energy efficiency measures such as reducing energy losses through windows; however, she has not made any such investments. Like most tenants, she is hesitant to put money into improvements in a building which she does not own. Three Sisters overarching energy burden goal is to see the business' energy costs reduced. The proprietor felt that an average savings of $60 per month (approximately 20%) would be an attainable goal that would help reduce her energy burden and help her business' viability.

The project team has identified initial strategies, based off of Roadmap actions and resources, that could be employed by Three Sisters and its landlord to potentially reduce the business' energy burden and increase its resilience. These strategies include:

- Education: This entails education for the business as well as the property owner about the benefits of energy efficiency investment and behavioral changes which can result in reduced energy consumption. Information to support such an action is available from utilities, HVAC contractors, educational facilities, state energy offices[22] such is the Missouri Division of Energy, and through federal agencies, such as EPA's Energy Star program which provides specific guidance for both landlords and tenants.[23] The proprietor of Three Sisters can also maintain familiarity with the building's energy operations including metering and existing equipment.

[22] For example, see information and resources available from the MoDNR Division of Energy at, https://energy.mo.gov/consumers
[23] ENERGY STAR®. *Small Businesses: Renters and Tenants.* energystar.gov/buildings/facility-owners-and-managers/small-biz/renters-and-tenants

General knowledge about energy efficiency and about the building itself can provide a common basis for discussions between the landlord and tenant as they work together.

- Benchmarking Performance: The project team also recommends that Three Sisters benchmark the building's performance through tools such as the ENERGY STAR Portfolio Manager.[24] By tracking energy usage over time, landlords and tenants can gain a better understanding of the performance of their building as compared to similar buildings, how improvements could impact that performance, and be used a means to measure progress. During benchmarking, it is recommended that businesses compare their building's performance to the goals they have set (in this case, nearly a 20% energy bill reduction for Three Sisters). An energy audit of the building would provide additional, specific information about the building by identifying problem areas and improvements that could make the building more energy efficient.

- Invest in Energy Efficiency: Based upon the data identified from benchmarking performance, Three Sisters and the building owner can discuss the appropriate energy efficiency measures that would enable achieving goals. Examples of measures that can be considered for Three Sisters include:

    - Smart Thermostats
    - Efficient HVAC System
    - Building Envelope Improvements as identified through research or an energy audit (e.g. insulation, weather stripping, and/or window replacement)

- Develop Financing Plan: A critical aspect of energy efficiency improvements is determining who pays for improvements, and how financing is obtained, if needed. In the case of Three Sisters, they may work with the building owner to determine lease terms that align the investment and benefits of energy efficiency measures. Restructuring the lease in this manner may result in increased likelihood of successful implementation of energy efficiency measures. Such terms could include provisions by which the landlord and Three Sisters are each responsible for a share of energy costs and energy efficiency improvements. The proportionate share could vary based upon the length of the lease and remaining term when the investments are made.[25] By splitting both the benefit and cost of the energy efficiency improvements, Three Sisters may be able to reduce its energy burden and the landlord may be able to keep a valuable tenant.

  In addition to exploring lease modifications, Three Sisters and its landlord can explore financing opportunities including PACE financing and the Missouri FIRST program which are described in more detail in both this case study and the *Roadmap*. Energy efficiency programs offered by utilities can also help reduce the cost of energy efficiency improvements. Ameren Missouri, the building's natural gas utility, has rebates available for energy efficient HVAC systems as well as building envelope improvements.[26] The business could also start discussions with RMU about the possibility of creating energy efficiency programs for small businesses. Partners, such as MoDNR's Division of Energy, can provide valuable information, experience, and leadership in discussions and resulting activities that could benefit both Three Sisters and RMU.

[24] ENERGY STAR®. Energy Start Portfolio Manager®. energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager
[25] For sample lease terms, see: *Energy Efficiency Lease Guidance*. NRDC. nrdc.org/resources/energy-efficiency-lease-guidance ; and *Making Efficiency Work for You, A Guide for Landlords and Tenants to Collaborate on Saving Energy and Resources.* Institute for Market Transformation. imt.org/wp-content/uploads/2018/02/Making_Efficiency_Work_for_You.pdf
[26] Ameren Missouri. For My Business, ameren.com/missouri/business/energy-efficiency/natural-gas

Roadmap Application to the City of Rolla and its Small Businesses

Small businesses like Three Sisters are a foundational component of the SMSC landscape, and it is critical to ensure they have the support to grow and thrive. A strong local business presence is often indicative of successful communities. As such, it is imperative for communities and local governments to serve as advocates for their small businesses. As evidenced by the individual experience of Three Sisters, as well as the obtained survey data, energy costs are a concern for businesses within Rolla. As a scalable document, the *Roadmap* is intended to be applicable for various types of users – from individual businesses to entire communities. The following sections outline how *Roadmap* actions can be applied both by the City of Rolla or local businesses, such as Three Sisters, to achieve energy efficiency goals. The remaining sections of this case study are presented in a more generic sense and are intended for use and application by various users that include at the local business level as well as on a larger level, such as local government.

Leveraging Stakeholders, Partners and Community Assets

Stakeholder Engagement – Engage stakeholders early in the resilience planning process.
Stakeholders should be engaged to articulate priorities, assess baseline conditions, refine goals and assist in developing implementation strategies. Successful stakeholder engagement can increase the potential for long-term support and the chances for success.
Leverage Partners and Assets - Convene skills, resources and perspectives.
Leveraging available resources, partners and assets can aid in mitigating critical gaps in funding and expertise, as well as provide a number of additional co-benefits.

The Rolla community has a variety of potential stakeholders and partners, which can be engaged in its efforts to increase the resilience of its downtown businesses by reducing their energy burden. Stakeholders can add their knowledge, experience and perspectives to resilience planning and prioritization. They help inform plans to better fit community needs and priorities. Partners are those people or entities that bring skills or resources needed for resilience planning and implementation. There is overlap between the two, but partners provide resources such as funding, personnel, equipment or services necessary for resilience related activities.

Table 3 sets forth a number of potential partners and stakeholders which could be engaged by the community. This is not an exhaustive list and there are certainly other stakeholders and partners that could also be engaged to add value. This table provides the name and description of the entity as well as potential contributions it could make to resilience planning and implementation. All of the entities listed could be engaged for community-wide efforts. Individual businesses working on their own resilience efforts will find those in blue most appropriate for engagement.

Legend

● Applicable to the City of Rolla and Businesses

○ Applicable to the City of Rolla Only

Table 3 Stakeholders and Partners

Name	Description	Contribution	Application
City Officials, Staff and Related Entities			
Rolla Board of Public Works	Appointed by the Mayor and confirmed by the City Council, the Board oversees the administration of Rolla Municipal Utilities and approves electric rates and charges.	Can provide perspective relating to decisions of the Board of Public Works operation of the electric utility. Participation in planning activities, provides the Board information and a knowledge base for future decisions.	○
Rolla Municipal Utilities	The municipally owned electric and water utility serving the City of Rolla.	RMU can provide information relating to usage, the electric system, potential energy efficiency initiatives, the impact of initiatives on rates and the grid. Carries out the direction of the Board of Public Works including programs which impacts electric customers.	●
City Mayor	Provides day-to-day guidance to the City Administrator and appoints members of the Rolla Board of Public Works. Responsibilities for City Council meetings include setting agendas, chairing meetings and calling special meetings as needed.	Can provide perspectives relating to community governance and the balancing of City priorities, as well as information regarding community member interactions, complaints and requests. Sets meeting agendas and chairs meetings in which resilience planning and implementation matters may be discussed or acted upon. Can appoint Rolla Board of Public Works members interested in or have knowledge related to energy efficiency and other resilience opportunities.	○
City Council	Council members, as a group, are the legislative and policy making body of the City. The City Council passes ordinances, budgets and policies under which city business is conducted. The City Council confirms Municipal Utilities Board Members and approves rates and charges.	Can provide perspectives relating to community governance and the balancing of City priorities, as well as information regarding community member interactions, complaints and requests. Must pass appropriations and ordinances which may be necessary to implement resilience planning and implementation.	○
City Administrator	Chief administration officer of the city supervising and coordinating activities of all departments and offices.	City-wide perspective over operations, budget, staffing and other information.	○
Other City Employees	Includes those within the Community Development and Public Works Departments.	Employees of multiple city departments have duties, knowledge and information related to the downtown area. These departments also administer programs relating to energy codes, infrastructure and other services critical to the vitality of downtown Rolla.	○

Rolla Regional Economic Commission	Contracts with the City for economic development services and coordination. Members of the Committee include the Rolla Mayor and three individuals appointed by the City Council.	Can provide information regarding economic development activities and opportunities.	○
Business Interests			
Downtown Businesses	Generally, local retailers, service providers, restaurants and other commercial enterprises located in downtown Rolla.	Can provide information and data relating to energy usage, buildings, energy burden and business needs. May be willing to participate in programs or pilots relating to efficiency, distributed energy, microgrids or other resilience related opportunities, including pooling of efforts, purchasing or contracting to gain efficiencies of scale.	●
Downtown Property Owners	Owners of buildings in downtown Rolla	Have information relating to their buildings and tenants, as well as the impact of initiatives on property owners. May be willing to participate in programs relating to energy efficiency or provide other information.	●
Rolla Chamber of Commerce	Local association to promote the community and its economy, as well as provide networking opportunities and other benefits to its members.	Can provide general perspectives and needs of existing and prospective local businesses on energy efficiency; identify specific businesses or types of businesses that could benefit from efficiency measures or training; and act as a conduit for education or information gathering relating to resilience planning and implementation.	●
Rolla Downtown Business Association (RDBA)	Local organization consisting of business owners, property owners, residents and other parties interested in the Rolla downtown.	Can provide general perspectives and needs of existing and prospective downtown businesses; can help identify and reach businesses that could benefit from reduced energy burden; and can act as a conduit for education, information gathering and convening necessary for resilience planning and implementation.	●
Local contractors and HVAC installers	Local businesses that install energy efficient systems, equipment and building improvements that lead to lower energy consumption.	Can provide information relating to energy efficiency measures, installation, costs, as well as installation services.	●
Missouri Department of Economic Development	State agency primarily responsible for encouraging economic growth in Missouri.	A source of information and funding for cities and counties that can be used to spur qualifying business retention or expansion projects. It can provide information relating to business needs, special taxing district formation and utilization, business/community marketing, downtown revitalization and tax credits.	●
Other Utilities			
Ameren	Investor owned utility that provides natural gas service to a number of the downtown businesses.	Has rebates for natural gas business customers for highly efficient HVAC systems, water heating, food service equipment, insulation and other building shell and equipment upgrades. May be able to	●

		provide information and coordination relating to resilience planning and implementation in Rolla.	
Columbia Power and Light	Columbia Power and Light is the municipally owned electric utility in Columbia, MO, a community approximately 90 miles north of Rolla on Highway 63.	Columbia Power and Light runs a wide variety of commercial rebate and incentive programs for its customers in a "college town" like Rolla. It could be a source of information and best practices relating to potential utility programs, rate design and measurement.	○
City Utilities	City Utilities is the municipally owned electric utility in Springfield, MO, a community approximately 100 miles southeast of Rolla on Interstate 44.	City Utilities runs a variety of commercial rebate and incentive programs for its customers. It could be a source of information and best practices relating to potential utility programs, rate design and measurement.	○
Other utilities, as needed		Other utilities with information and leading practices regarding consumer energy efficiency/conservation programs, rate design and other resources may be identified.	○
Associations/Organizations			
Meramec Regional Planning Commission (MRPC)	Voluntary council of governments in an eight-county area which includes Phelps County and Rolla.	MRPC provides, among many other services, grant writing; business loans; and economic development planning. It can also be a source of leading practices within its area as well as those from the other 19 councils of government in Missouri.	○
The Regulatory Assistance Project (RAP)	A non-governmental organization working to accelerate the transition to a clean, reliable and efficient energy future.	RAP provides information, tools and assistance relating to rate design and energy efficiency programming to policy makers and stakeholders.	○
Missouri Public Utility Alliance (MPUA)	MPUA represents municipal utilities in the state.	The MPUA is a source of information for leading practices, data and other information for its member utilities.	○
American Public Power Association (APPA)	National association of public power utilities. It provides advocacy, education and collaboration to its members. Rolla is a member of the APPA.	The APPA can be a source of training, leading practices and data related to system operation and management, resilience/reliability implementation opportunities, energy efficiency case studies and progress measurement for its members. It has training resources dedicated specifically to a variety of economic development topics, rate design.	○
Midwest Energy Efficiency Alliance	Collaborative network advancing energy efficiency in the Midwest for sustainable economic development and environmental stewardship.	Can provide information and leading practices regarding energy efficiency projects, rate design, case studies and provide opportunities to network with other entities.	●
Renew Missouri	Non-governmental organization dedicated to advancing renewable energy and energy efficiency in the state.	Can provide information and leading practices related to renewable and energy efficiency planning and implementation.	●
Missouri Energy Initiative	Non-profit association of public and private sector entities created to advance energy economic development, innovation and education.	Can provide Property Assessed Clean Energy (PACE) financing for energy efficiency and renewable energy projects in commercial applications.	○

Missouri Clean Energy District	Statewide PACE District.	Can provide financing for energy efficiency and renewable energy projects in commercial and industrial applications.	○
Government Agencies			
Missouri Division of Energy	The state energy office that is a division of the Missouri Department of Natural Resources.	The Division of Energy is a source of information and technical assistance relating to energy efficiency, energy resources, training, measurement, outreach, partnerships and financing opportunities. It provides low-interest financing for energy efficiency and other improvements to reduce energy costs in school and local government buildings.	●
Missouri State Treasurer's Office	State Office that administers the Missouri First Linked Deposit Program.	The Missouri First Linked Deposit Program is a potential source of lower interest rate financing for energy efficient equipment and building renovations, which could reduce energy costs of small businesses.	●
U.S. Department of Energy	Federal agency responsible for addressing the nation's energy and nuclear challenges through science and technology solutions.	The Department of Energy has a vast amount of data and information relating to energy efficiency, energy resources and technology which can be used to develop programs and assist those interested in energy efficiency and distributed energy resources.	●
U.S. Environmental Protection Agency	Federal agency responsible for protecting human health and the environment.	Source of information and tools relating to energy efficiency. Responsible for the Energy Star program, including the Portfolio Manager, which can be used to benchmark energy performance of buildings and facilities.	●
U.S. Department of Agriculture, Rural Development	Part of the U.S. Department of Agriculture, Rural Development that promotes rural economic development.	Provides a variety of funding programs for infrastructure, energy efficiency and distributed energy projects.	○
Others			
Other Communities, as needed		Other communities with information and leading practices regarding system management, planning and other resources may be identified.	○
Missouri University of Science and Technology	State university located in Rolla, adjacent to downtown. MS&T, known for its School of Engineering, has administrative offices and student housing located in downtown. It also maintains living laboratories using solar and microgrid applications through its Energy Research and Development Center.	Can provide information and data regarding its student population and staff that frequent downtown businesses, energy efficiency implementation options, leading practices, researching findings. The University has information relating to its facilities in downtown and may be willing to participate in pilot programs. Student staff may be able to supplement RMU staffing through internships. Certain programs or classes participate in planning activities for communities as part of their course curriculum.	●
Rolla Technical Institute/Center (RTI)	Vocational institute serving more than 700 secondary students and 150 adults in the Rolla region. RTI provides college and career preparation as well as workforce	RTI or similar vocational programs may be able to offer energy efficiency information and education to the community and local businesses.	●

training in more than 18 programmatic areas, including HVAC.

Partners

Partnerships allow resilience planning to be more comprehensive and effective than could be achieved through an individual effort. Partners bring many resources to the planning or implementation process. The first step in selecting partners is to determine why they are needed. By looking at goals relating to energy burden and efficiency, available resources, weaknesses and known opportunities, the community and downtown businesses can identify areas in which partners could be beneficial. In the area of energy efficiency and the reduction of energy burden, partners with technical knowledge or experience in cost effective efficiency measures, energy auditing, funding and rate design could play significant roles and help achieve progress toward these goals.

Partners often fit into one of five resource categories. Table 4 describes those categories and lists a few of the entity types that could be looked at as potential partners for Rolla.

Table 4 Partner Resource Categories

Partner Resource Category	Description	Types of Partners
Experience	Stakeholders or partners that have significant experience or knowledge in an area: • Energy Auditing • Rate Design • Energy Efficiency	Other utilities, government officials, engineers, contractors, Councils of Government
Information and Data	Holders of data, records, or other information: • Energy Usage • Business Contact Information • Energy Code Compliance	State, county, or city agencies, customers, associations, utilities
Staffing	Those with personnel to assist with or carry out an activity: • Training • Energy Auditor • System Installation • Consultants	Utility associations, neighboring communities, civic organizations, local businesses and learning institutions (including those with the ability to provide intern labor)
Physical Assets	Those with equipment or facilities: • Infrared Cameras • Meeting Space	Local businesses, emergency response agencies, utilities
Funders	Entities that can provide financial resources	Federal and state agencies, foundations, other city departments

Assets

Rolla has several unique assets that place it in a position to further its community resilience goals. Leveraging these assets will enable implementation of important initiatives and continue to identify areas in which to improve resilience. These assets are listed and described below.

- Historically vibrant downtown.
- Mix of retail, office, commercial and residential uses catering to students and other residents.

- Proximity to MS&T (students frequent downtown stores and restaurants, campus and private housing in downtown for students).

Identify Innovative Funding Sources

Offset resilience initiative costs.

SMSC often face increased funding barriers and leveraging funding sources can play a critical role in determining whether plans can be implemented.

From local government leaders to small business owners, taking action to increase energy efficiency, drive down energy burden and strengthen overall community economic well-being is a full community effort. Resources need to be available to support small business owners, especially those who rent their space, in making energy efficiency improvements. Similar to the owner of Three Sisters', many small business owners lack familiarity with energy efficiency measures, which can serve as significant barrier to implementing measures without available resources or guidance. Local government entities, utilities and organizations can leverage internal and external funding sources to support the small businesses in their communities to pursue energy efficiency. Once supportive resources are in place, local business owners can better leverage additional funding sources to increase energy efficiency in their businesses. This section details examples of how local leaders and small-business owners can leverage funding resources to increase energy efficiency.

Utility-Community Partnership for Thriving and Energy Efficient Businesses
The City of Rolla and RMU could leverage revenues to launch an educational and marketing campaign focused on boosting small business success by increasing awareness of opportunities to reduce energy burden through energy efficiency investment. Through a city-utility partnership, these entities would contribute both financial and skill resources to launch a successful campaign. For example, RMU would contribute knowledge of and resources for energy efficiency measures. The City of Rolla and RMU can expand their resources by partnering with each other and also by developing other productive partnerships to bolster the success of the educational and marketing campaign. The City and RMU could partner with local organizations, like the Rolla Chamber of Commerce and RDBA, that have existing connections and regular contact with member businesses, and that are often considered trusted partners by local businesses.

The purpose of the campaign could focus on alleviating the four aforementioned energy burden drivers outlined below.

- **Physical:** What types of facility and equipment upgrades would enhance energy efficiency in my facility? What energy efficiency measures are right for my facility? How can I have an energy audit conducted on my facility to answer these questions?
  - Heating system and fuel type
  - Building envelope
  - Weather extremes
- **Economic:** What resources are available to help fund energy efficiency investments in my facility and how do I apply for and secure funding?
  - Level of business revenues
  - Upfront costs
- **Policy:** How does policy affect the availability of energy efficiency programs for my business? What energy efficiency programs are available?
  - Insufficient policies and programs addressing small business energy efficiency

  - Utility Rate Design
- **Behavioral:** General education on energy efficiency, energy usage behavior and energy efficiency programs.
  - Lack of knowledge
  - Oversight resources

The campaign would address a key small business barrier to energy efficiency, lack of knowledge or resources to pursue energy efficiency. The City, utilities, and their partners could equip business owners with the information needed to successfully invest in energy efficiency and connect them to resources to pursue these investments.

Financial Assistance for Small Businesses to Invest in Energy Efficiency

There are a number of resources for small businesses to pursue energy efficiency. PACE financing opportunities and other loan programs are available in the state of Missouri. These financing opportunities can expand the financial bandwidth of small businesses to invest in energy efficiency. Energy efficiency efforts could be a follow-on opportunity to the above education and marketing campaign. Business owners can pursue investments in energy efficiency based on the knowledge gained through the educational campaign relating to energy audits, appropriate energy efficiency measures for their business and how to apply for funding opportunities. If business owners invest in energy efficiency, they will realize benefits associated with lowering energy bills, having a more efficient facility and equipment, freeing up funds to spend on other expenses or increase employee rewards and creating a healthier, more comfortable facility environment for employees and customers. Improved business outcomes will benefit overall community economic well-being.

Missouri's Office of the State Treasurer's Missouri Linked Deposit Program[27] (Missouri FIRST) provides a suite of opportunities for small businesses, agriculture producers and local governments to apply for low-interest loans to improve their business or businesses in their community. Missouri FIRST partners with lenders to enable them to lower the interest rate to borrowers by 2 to 3%. One of the Missouri FIRST is the Small Business Program, which allows Missouri small businesses to apply for low-interest loans to aid growth and vitality. Eligible businesses include for-profit businesses that are headquartered, maintain operations and transact business in Missouri and employ less than 100 full-time employees. Businesses cannot owe unpaid, non-protested taxes to the State or other political subdivisions and cannot have unresolved environmental compliance complications with the Missouri MoDNR. Awarded loans can be used for a variety of projects and expenses including, but not limited to inventory, rent, utilities, insurance, taxes, professional fees, or purchase of land or buildings. Loans can also be used to purchase, rent, or lease equipment as well as renovate, repair, or maintenance equipment or facilities all of which could result in decreased energy burden if applied toward energy efficient equipment or building envelope energy conservation measures.

PACE financing programs are authorized under Missouri statute; and communities can work with their citizens to determine how such programs can be beneficial for them. PACE financing programs provide eligible property owners loans, which are repaid through an additional charge on the owner's property tax assessment, for energy efficiency and renewable energy improvements. Rolla is a participating municipality for the Missouri Clean Energy District and Show Me PACE Clean Energy District programs.[28, 29] Residential, commercial, industrial, agricultural, multi-family, non-profit, and public facility projects are eligible under both of these programs. If approved by the municipality, a wide variety of energy efficiency projects are eligible through these PACE programs including, but not limited to, insulation, installation of smart energy control systems, heating and cooling improvements, and more.

[27] Missouri State Treasurer. Missouri First. treasurer.mo.gov/content/low-interest-loans
[28] Missouri Clean Energy District. Access Capital for Energy Projects. mced.mo.gov
[29] Show Me PACE. showmepace.org

Use Federal and National Lab Resources

Support projects and initiatives.

Federal agencies and national laboratories, such as USDOE, FEMA and the EPA provide several quantitative and qualitative tools that can be leveraged for resilience planning and support projects

A multitude of online quantitative and qualitative resilience planning tools are available for local planners to leverage in their resilience efforts. Many tools are offered by federal agencies and national labs and are supported by case studies demonstrating their usefulness in various applications. Below are descriptions of how Rolla resilience leaders and small business owners can leverage both quantitative and qualitative tools to decrease energy burden.

Quantitative Tools

EPA's ENERGY STAR Portfolio Manager® is a building benchmarking tool that allow building owners to measure and manage the energy usage, water usage and greenhouse gas emissions of their building. Small business owners who rent a portion of a building for their business space will need to collaborate with their landlords to gather information for the whole building. Support and cooperation of landlords is essential for effective use of the tool, which may serve as a barrier for some small business owners. To use the tool, building owners need to enter basic information about their building and information from their energy bills into the ENERGY STAR Portfolio Manager® tool to measure and manage their energy and water usage. The tool also allows users to set energy use goals and compare energy usage against that of other similar buildings.

Qualitative Tools

Resilience goals and challenges vary from community to community and from business to business. Communities and businesses around the globe are taking action to increase resilience and energy efficiency is often a key component of many of these efforts. SMSC and small businesses can build on lessons learned and leading practices of their peers that are often detailed in case studies focused on topics such as resilience, energy efficiency, or city and utility partnerships. Table 5 shows collections of case studies that Rolla or its small businesses can look to in order to inform their resilience and energy efficiency efforts.

Table 5 Resilience Case Studies

Case Study Collection	Entity	Description	Source
U.S. Climate Resilience Toolkit	U.S. Global Change Research Program	Collection of case studies detailing how businesses and communities across the U.S. are building resilience. Users can filter cases studies based on the climate stressor or threat, topic, step in resilience planning, or region.	toolkit.climate.gov/case-studies
American Mayors and Businesses: Building Partnerships for a Low Carbon Future – Volumes I - III	Center for Climate and Energy Solutions (C2ES)	Multi-volume portfolio of case studies focusing on city-utility partnerships to advance resilience through efforts including, but not limited to, advancing energy efficiency, renewable energy generation and use and low-carbon mobility.	c2es.org/document/american-mayors-and-businesses-building-partnerships-for-a-low-carbon-future-volume-iii

Measure Success

Define metrics and performance indicators early in resilience planning.

Consistent measures to monitor progress enable communities to effectively demonstrate progress and accountability, promote continuous improvement and make forward-looking decisions and investments.

Performance metrics allow a community to evaluate the benefits of efforts and investments through monitoring progress toward specific targets. Consistent measurement enables demonstration of progress, provides accountability, promotes continued improvement and allows strategic and data driven decision making. Publishing or reporting measurements not only increases transparency with stakeholders, partners and community members, it can also serve as a basis to obtain funding for additional investment and support for continued or new initiatives.

The initiative of addressing resilience by decreasing the energy burden of downtown businesses is new to the community and, as such, it has no metrics currently in place to measure performance.

Metrics measuring progress toward the reduction of energy burden can measure decreased energy usage, decreased energy costs and the decreased proportion of the business' revenues to energy costs. Additional, less direct, measurements of progress can include educational opportunities or participation, program participation, energy code compliance and other measures showing progress in areas that foster energy burden reduction.

Similar to many other small businesses, Three Sisters had not developed specific targets or goals relating to achieving its energy burden prior to the interview for the case study; however, during the interview, the proprietor stated that saving, on average, $60 per month on energy costs would be beneficial and a goal that would make a meaningful reduction in energy burden for the business. Given the understandable hesitance to invest in improvements to another's property, tenants such as Three Sisters may find targets relating to information gathering, such as building benchmarking, to be a good first step towards their goal of reducing energy costs by $60 per month. By utilizing benchmarking tools such as the Energy Start Portfolio Manager, the tenant can use information relating the building's performance to similar buildings and the potential impact of selected improvements, as a basis to develop an energy savings strategy with the landlord.

A reasonable, initial goal for Three Sisters, and other similar businesses, could be to enter building and energy usage information into the benchmarking tool for six consecutive months to provide a baseline of information. With the information gathered through benchmarking, the tenant and landlord could identify opportunities for joint, or individual, action toward energy efficiency to reach an energy savings goal such as an average savings of $60 per month identified by Three Sisters. Actions could include entering into lease provisions in which both would share in the costs and benefits of energy efficiency upgrades, having an energy audit performed, and the implementation of identified energy savings measures. As part of this process, Three Sisters and the landlord can establish longer term and incremental targets to measure success. These targets could include self-educational activities relating to energy efficiency, implementation timelines, and, ultimately, a set reduction in energy usage. An incremental approach of this type could prove successful for tenants and landlords alike.

As described more fully in Table 6, potential metrics to measure the performance of this initiative are listed below. All metrics presented could be useful for community-wide resilience efforts. Individual businesses may find those shown in blue useful to measure progress toward their resilience goals.

- Energy Burden
- Energy Savings

- Energy Efficiency and Conservation Education for Downtown Businesses
- Energy Efficiency Programs for Downtown Businesses
- Energy Usage After Energy Efficiency and Conservation Training
- Energy Efficiency Training for Landlords
- Building Energy Code Adoption
- Building Energy Code Compliance
- Job Training for Resilience Efforts
- Energy Audits
- Amount of Energy Savings from Energy Efficiency Programs
- Energy Efficiency Program Participation Rate
- Building Energy Benchmarking

Data sources are readily available for most the potential metrics below, however, businesses may be reluctant to provide revenue information to measure energy burden, so that measure in particular is most suitable for the businesses themselves to track. However, to provide a proxy measure, energy usage can be used. The metrics below are amongst those that can be used to monitor the progress toward reducing the energy burden of downtown businesses. Any metrics adopted should be revisited regularly to determine if they are useful in measuring and driving performance. If not, the utility should look for ways to improve its usefulness or adopt a different metric that provides the community better information.

Legend

- ● Applicable to the City of Rolla and Businesses
- ○ Applicable to the City of Rolla Only

Table 6 Potential Metrics

#	Metric	Target	How and When Measured	Data Sources Needed	Why Important	Application
1	Energy Burden	Decreased average energy burden (the percent of business revenue spent on energy) of downtown businesses.	Compare energy burden during baseline period to that of measurement period. To normalize for weather between baseline and measurement years, divide kWh used during the period by total heating and cooling degree days for the same period. Multiply by the energy cost. Compare to previous year. =[[('sum kWh used')/('sum of heating and cooling degree days')]*[cost per kWh]]/[revenues] Measure annually.	Revenues, energy usage and energy cost per kWh of businesses for baseline periods and measurement periods. Degree days for the baseline and measurement periods. Degree day calculator: portfoliomanager.energystar.gov/pm/degreeDaysCalculator	Businesses with high energy burdens have less profit to reinvest in the business, decreasing the likelihood of business continuation. When downtown businesses close, jobs are lost, local services are lost, community focus and cohesion, decrease and communities lose tax base.	●

2	Amount of Energy Savings from Energy Efficiency Programs for Downtown Businesses	Meet target energy savings from efficiency measures	Compare energy costs during baseline period prior to installation of efficiency measures to costs after installation. Compare to target. To normalize for weather between baseline and measurement years, divide kWh used during baseline period by total heating and cooling degree days for the same period. Multiply by energy cost. Compare to target. =[('sum kWh used ')/('sum of heating and cooling degree days')]*[cost per kWh] Measure annually.	Energy usage of businesses for baseline periods and periods after program participation obtained from participants. Degree days for the baseline and measurement periods. Degree day calculator: portfoliomanager.energystar.gov/pm/degreeDaysCalculator	Lower costs result in decreased energy burden.	●

3	Energy Efficiency Programs for Downtown Businesses	Increase number of energy efficiency programs for downtown businesses to target.	Compare number of energy efficiency programs for downtown businesses to target. Measure annually.	Number of energy efficiency programs targeting downtown businesses for baseline and measurement periods. Obtained from utilities or other program administrators.	Energy efficiency measures and behavioral changes can lead to significant decrease in energy consumption, thus lowering energy costs impacting profitability of downtown businesses.	○
4	Energy Efficiency and Conservation Education for Downtown Businesses	Meet target number of businesses receiving education on energy efficiency or conservation measures.	Compare total businesses receiving education or training to target. Measure annually.	Number of businesses participating obtained from education or training provider or sponsor.	Energy efficiency measures and behavioral changes can lead to significant decrease in energy consumption, thus lowering energy costs impacting profitability of downtown businesses.	○

5	Energy Usage After Energy Efficiency and Conservation Training	Reduced energy consumption by downtown businesses participating in energy efficiency and conservation education.	Compare energy usage of businesses after training to same periods of previous year. To normalize for weather between baseline and measurement years in buildings that are heated or cooled, divide kWh used during baseline period by total heating and cooling degree days for the same period. Compare to kWh used during measurement period divided by total degree days for the measurement period. =['sum kWh used in business']/['sum of heating and cooling degree days'] Measure quarterly.	Energy usage of businesses for baseline periods and periods after educational activity obtained from participants. Degree days for the baseline and measurement periods. Degree day calculator: portfoliomanager.energystar.gov/pm/degreeDaysCalculator	To determine whether educational activities were successful or implemented and inform future outreach activities regarding energy efficiency.	●
6	Energy Efficiency Training for Landlords	Meet target number of downtown landlords receiving education on energy efficiency or conservation measures.	Compare total number of downtown landlords receiving energy efficiency education to target. Measure annually.	Number of downtown landlords participating from the education or training provider.	Rental buildings tend to be less energy efficient than owner occupied buildings. Increasing energy efficiency would lower energy usage and could lower energy burden of tenants.	○

7	Energy Audits	Meet target number of downtown building energy audits.	Compare number of downtown energy audits to target. Measure annually.	Number of audits from energy auditor or company responsible for performing the audits.	Those receiving audits are more likely to implement energy efficiency measures. Metric could measure number of businesses receiving audits which also implemented at least one measure.	○
8	Building Energy Code Adoption	Building energy codes meet most current IECC code.	Compare current building energy code to most current IECC code. Measure every 5 years.	Current city building energy codes. Most current IECC code: codes.iccsafe.org/content/document/998?site_type=public	Communities with current building energy codes are likely to have substantially lower energy usage than those that are not, resulting in lower energy burden for residents and businesses.	○
9	Building Energy Code Compliance	Increase number of downtown buildings meeting community building energy codes.	Number of buildings meeting downtown building energy codes during the measurement period as compared to baseline period. Measure annually.	Number of occupancy permits or inspection certificates issued during the baseline and measurement periods. Information obtained from city department responsible for inspections or city clerk.	Buildings built to energy code standards are likely to have substantially lower energy usage than those that are not.	○

10	Building Energy Benchmarking	Increase the number of downtown buildings' energy use benchmarked against similar buildings	Number of downtown buildings with operational data entered into a benchmarking/analysis tool (such as the Energy Star Portfolio Manager or other benchmarking/analysis system) during measurement period as compared to the baseline period. Measure every 2 years.	Energy consumption data, cost information and operational use details for buildings available from building occupants or owners. Performance and analysis information generated by benchmarking/analysis system. The Energy Star Portfolio Manager can be found at: energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager/learn-how-portfolio-manager	Energy benchmarking allows building managers or owners to assess energy use and identify opportunities to implement energy and water management systems, install efficiency measures and understand a building's performance as compared to similar facilities.	●
11	Job Training for Resilience Efforts	Increase job training programs that align with employment opportunities created by the community's resilience efforts.	Difference in the number of job training programs that address workforce skills needed for resilience plan implementation (e.g. HVAC contractors or energy auditors) during measurement year as compared to the previous year. Measure annually.	Inventory of workforce skills necessary for resilience plan implementation. Number of job training programs addressing such skills.	A workforce with the skills necessary to implement a community's resilience plan will help ensure that the plan is implemented. Additionally, a skilled workforce will help retain and attract new employers, maintain essential services and amenities in the community, create economic activity and lead to a higher standard of living.	○

12	Electric Utility System Peak Demand Reduction	Reduction in peak demand as a percent of total peak demand.	Peak MW reduction divided by the total peak demand. =['sum peak MW reduction']/['sum of peak demand'] Measure twice a year.	Peak MW savings and total peak demand from electric utility.	Reduce stress on distribution system and need for additional utility T&D infrastructure to meet higher peak demand.	○
13	Energy Efficiency Program Participation Rate	Increase participation in energy efficiency programs.	Compare number of downtown business participants in energy efficiency programs to target. Measure annually.	Number of participants, obtained from city and/or program sponsor.	Energy efficiency measures and behavioral changes can lead to significant decrease in energy consumption, thus lowering energy burden.	○

Conclusion

The value in implementing energy efficiency for small businesses is significant for both building owner and tenant. This has become increasingly evident in the face of the recent COVID-19 pandemic and an increasing transition to online retail and services. For buildings owners, this presents a predicament because with no tenants in the commercial space the building owner will be saddled with carry over costs and lost revenue. On the other hand, if a tenant's energy expense are too high it may not allow them to continue to run their business, which further exacerbates the problem and forces them to vacate. Prior to COVID-19, nearly 90%[30] of commerce within the United States occurred in brick-and-mortar spaces, encouraging mingling and gathering of customers. However, stay-at-home orders in 2020 shut the physical doors of one in five small businesses across the nation.[31] This has resulted in lost jobs and tax revenue for many cities across the country to invest , As conducting physical business became impossible, businesses navigated to e-commerce and adopted technology rapidly. Now, businesses find themselves weighing the advantages of maintaining a brick-and-mortar space, particularly when considering the added costs of rent, utilities and other overhead expenses.

If local businesses find themselves driven into solely online presence, the implications are significant, particularly in SMSC, which place a high value community connectedness. The downtown district of an SMSC is often associated with the community's character, economic growth and a gathering space for residents. Without these businesses, downtown districts everywhere would lose their economic anchors, further intensifying the depopulation issue plaguing so many SMSC and decreasing their community resilience. Therefore, it is critical for SMSC resilience for retail districts, shop front owners and communities to invest in advancing energy efficiency measures for their local businesses.

Findings and Lessons Learned

The experiences of Rolla's small businesses in addressing energy burden have led to the following findings and lessons learned:

- For SMSC business owners, energy costs are the third most concerning issues for their business behind number of customers and mortgage or rent payments. High levels of energy burden can significantly impact community resilience, particularly economic and energy resilience. Small businesses with high levels of energy burden often find themselves disproportionately spending on energy expenses, leaving little to invest in their own economic growth and contributing to a continued cycle of decreased energy resilience.
- For small businesses and building owners in rural communities, access to information about the benefits and funding opportunities to implement energy efficiency projects is limited. This makes it challenging for small businesses and building owners to make decisions that improve their own economic resilience but also address broader community-wide resilience goals.
- There is additional need to provide technical assistance and broadly disseminate information to build awareness of existing resources to advance energy efficiency programs which will increase both energy and economic resilience in these communities.

- Encouraging landlords and tenants to implement energy efficiency measures by aligning costs and benefits, can reduce renters' energy burden, thus increasing the economic resilience of the business and community as a whole.

[30] U.S. Census Bureau. (2020). *Quarterly Retail E Commerce Sales, 3rd Quarter 2020*. census.gov/retail/mrts/www/data/pdf/ec_current.pdf
[31] Swanek, Thaddeus. (2020). *Poll Shows Most Small Businesses at Least Partially Open Amid COVID-19 Recovery*. U.S. Chamber of Commerce. uschamber.com/series/above-the-fold/poll-shows-most-small-businesses-least-partially-open-amid-covid-19-recovery

- Decreased energy burden is vital for protecting small businesses, which in turn decreases the impact of local chronic stresses, such as poverty for Rolla's vulnerable populations and can create much-needed local job opportunities. High levels of energy burden may make it challenging for small business to maintain a brick-and-mortar location in an increasingly virtual commerce culture. Therefore, development of strategies and providing opportunities and incentives to reduce energy burden for small businesses and increase energy efficiency should be a priority for local governments and their utilities.

Acronyms

AFUE	Annual Fuel Utilization Efficiency
APPA	American Public Power Association
C2ES	Center for Climate and Energy Solutions
COVID-19	Coronavirus-19
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
HVAC	Heating, Ventilation, Air Conditioning
ICC	International Code Council
LED	Light Emitting Diode
MRPC	Meramec Regional Planning Commission
MoDNR	Missouri Department of Natural Resources
MPUA	Missouri Public Utility Alliance
MS&T	Missouri University of Science and Technology
PILOT	Payment in Lieu of Taxes
PACE	Property Assessed Clean Energy
RAP	Regulatory Assistance Project
RDBA	Rolla Downtown Business Association
RMU	Rolla Municipal Utilities
RTI	Rolla Technical Institute
SMSC	Small- to medium- sized community
TPO	Thermoplastic Polyolefin
USDOE	United States Department of Energy

Appendix A: Downtown Rolla Business Energy Survey

Please provide as much information as is possible, even if complete information isn't available on all questions.

1. Please provide your name or business name.

2. Are you willing to share your name or business name as a participant in the Missouri Division ofEnergy *Roadmap to Resilience* Case Study for the City of Rolla?

☐ Yes

☐ No

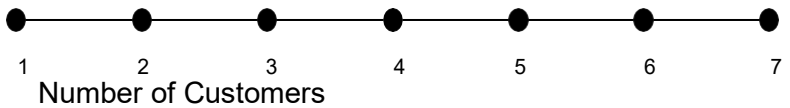
3. Please share the following:
3a.) Your type of business

3b.) Number of full-time employees or equivalents

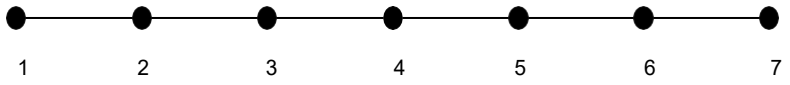
3c.) Hours of operation, including any seasonal variations

4. What costs concern you most relating to the economic performance of your businesses? Please rank items, with 1 being most concerning and 7 being least concerning.
[Please rank all option(s).]

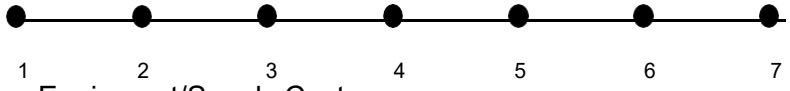
- Personnel Costs



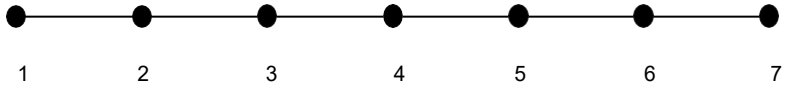
- Number of Customers



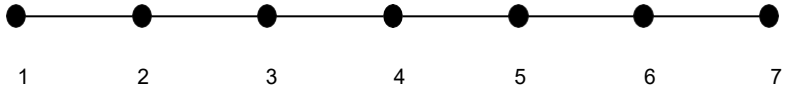
- Inventory Costs



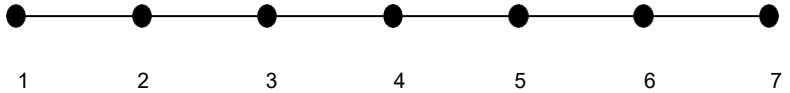
- Equipment/Supply Costs



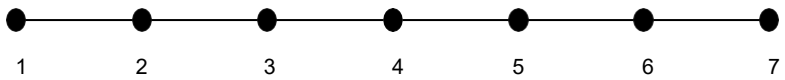
- Mortgage or Rent Costs



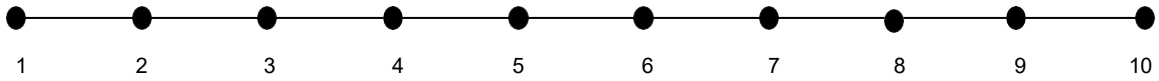
- Energy Costs



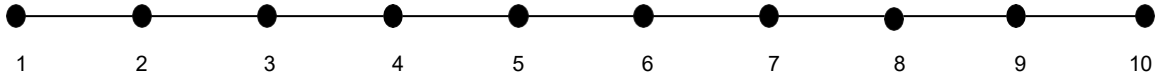
- Other



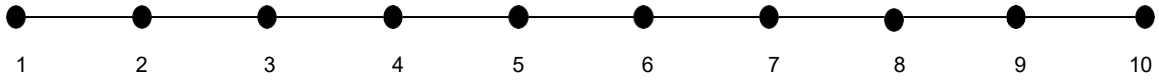
5. How do you rate the economic strength of your business prior to COVID-19?



6. How has your business been economically impacted by COVID-19?



7. How do you rate the economic strength of your business post COVID-19 or currently?



8. How frequently do you consider your energy costs to be a significant economic burden for your business?

☐ Always

☐ Often

☐ Sometimes

☐ Never

9. Has the burden of energy costs changed since the onset of COVID-19 local and state-mandated quarantine?

☐ Yes

☐ No

☐ Other

10. How aware are you of energy efficiency measures that could be used to decrease the energy usage of your business? Examples of energy efficiency measures are high efficiency appliances, LED lighting, building insulation.

☐ Very Aware

☐ Limited Awareness

☐ No Awareness

11. Have you considered implementing energy efficiency measures to reduce your businesses energy burden?

☐ Yes

☐ No

12. How comfortable are you in implementing energy efficiency measures?

☐ Very Comfortable

☐ Somewhat Comfortable

☐ Not Comfortable

13. If you were to install an energy efficiency measure what would it be?

14. What constraints prevent you from implementing this efficiency measure?

15. The following questions are technical in nature and might require some assistance. Do you prefer to answer now, or would you rather answer after meeting with an energy expert to discuss significant contributors to your businesses' energy burden?

☐ Yes, I'd like to answer now

☐ No, I'd rather meet with an energy expert and answer later

16. Building size (square footage) and percentage that is heated or cooled:

17. Description of major energy using systems and equipment. Please include type (HVAC, coolers, etc.), age, and SEER or other efficiency ratings, if known:

18. Hours during which space heating/cooling typically occurs or major energy using systems are operating:

19. To your knowledge, does your building meet Rolla’s building code energy efficiency requirements?

☐ Yes

☐ No

20. Has an energy audit been performed on your building in the past five years?

☐ Yes

☐ No

☐ Yes, but longer than five years ago

21. Have energy efficiency or conservation measures been undertaken in the past five years? If so, what was done and what was the impact on usage?

22. Is the building equipped with solar or other renewable energy sources? If yes, please describe, including the capacity and average amount of power produced by quarter, if known.

23. Are programmable thermostats or other automated energy use controls utilized? If so, please describe:

24. Information to Compute Energy Burden
Please provide the following:

- Energy usage by quarter by type (electricity, natural gas, propane) for 2020 and 2019.
- Energy cost by quarter by type (electricity, natural gas, propane) for 2020 and 2019.
- Revenues by quarter for 2020 and 2019.
- If you are not comfortable providing revenue information, please provide the percentage of your revenues that were used to pay energy costs, by quarter, for 2020 and 2019.